

THE CHROMOSOMES OF SCOLIOPIUS (LILIACEAE)

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Two species of *Scolioopus* have been described: 1, *S. bigelovii* Torr., occurring in the coast ranges of California from Santa Cruz Co. north to Humboldt Co. and 2, *S. hallii* Wats., from the west slope of the Cascades and Coast Mountains of Oregon.

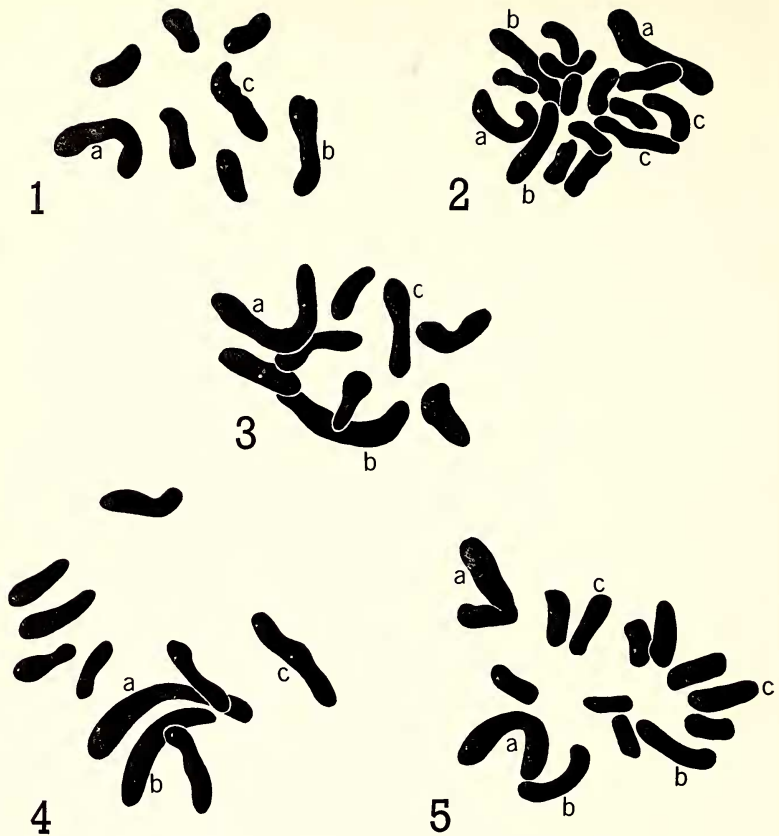
In 1932 Johansen reported 7 pairs of chromosomes in root tip material of *Scolioopus bigelovii*, originally obtained from the "native habitat" and "grown by the sand or water-culture method." He described the karyotype as: 1 long pair of chromosomes with medium constrictions, 1 long U-shaped pair, 1 medium-long straight pair, 1 medium-long curved pair, 2 short broad pairs, 1 short narrow pair.

Recently a number of collections of *S. bigelovii* (60.135, Sonoma Co., *Cave 62150*; 60.220, Humboldt Co., *Cave 6530*; 61.015, San Mateo Co., *Cave 6514*; 61.019, San Mateo Co., *Cave 6506*; 63.120, Sonoma Co., *Cave 6515*) made by Helen Mar Beard and Wayne Roderick, and now growing at the University of California Botanical Garden in Berkeley, have been examined for chromosome number, by means of the acetocarmine smear technique. By the time the tip of the first leaf is visible above the ground the youngest flower is already at the stage of mitosis in the microspore. Metaphase figures of this division (fig. 1) showed 8 chromosomes: 1 large (a), 2 medium-large (b and c), and 5 small. This discovery led the writer to examine some slides made in 1948 from material from Muir Woods, Marin Co., California. In all slides there were numerous examples of pollen grain metaphases with 8 chromosomes.

Pollen grains in all collections, save one, now growing at the Botanical Garden were of uniform size, with only a few scattered abortive cells, and the plants set good seed. Smears from ovules showed 16 mitotic chromosomes (fig. 2). That meiosis was normal is at least suggested. In the collections from Humboldt Co. there were also 16 mitotic chromosomes in the root tips, but the pollen grains were of all different sizes, and many were aborted. Two grains were found showing metaphases with 9 and 10 chromosomes respectively, including the 3 large ones, but varying numbers of small ones (figs. 3, 4). Pollen grains with deviating chromosome numbers may be the result of structural hybridity leading to asynapsis or desynapsis and consequent maldistribution of chromosomes at meiosis.

Root tips of the other species, *Scolioopus hallii*, received from Stanton Cook from Fall Creek, Lane Co., Oregon, had only 14 mitotic chromosomes (fig. 5). The 3 largest chromosome pairs resembled those in *S. bigelovii*, but there were only 4 small pairs.

The three largest chromosomes are probably homologous with Johansen's long U-shaped pair, medium-long straight pair, and medium-long



FIGS. 1-5 Chromosomes of *Scoliopus*: 1-4, *S. bigelovii*; 1, (6515) metaphase of division in microspore ($n=8$); 2 (6506) metaphase from cell of ovule ($2n=16$); 3, 4 (6530) metaphases of microspores showing extra chromosomes; 5, (65137) *S. hallii*, metaphase from root tip cell ($2n=14$). $\times 1660$.

curved pair. His long pair with median constrictions, represented in his drawing by a thin line connecting the arms, is probably homologous with two of the short chromosome pairs found in the present collections of *S. bigelovii*. It would have been of interest to know the origin of his plants, because of the suggestion of structural hybridity in our collection of *S. bigelovii* from Humboldt Co. It is also possible that there are some populations in which translocation has given rise to a long chromosome from two short ones.

The taxonomic position of *Scoliopus* has recently been discussed by Berg (1959; 1962). He states that it should be removed from the Parideae of Krause (1930) and "placed in the Melantheoideae, probably as a tribe of its own near the Tricyrteae and the Uvularieae (and the Calochortae)". Berg accepted Johansen's count for *S. bigelovii* of $2n = 14$,

but stated that the difference in basic chromosome number between this genus and other members of the Parideae cannot rightly be evaluated at present. It may be pointed out here that Satô's (1942) figure 54 of *Oakesia sessilifolia* of the Uvularieae shows 3 fairly large pairs and 5 small pairs as do our examples of *Scoliopus bigelovii*. This similarity of karyotypes thus substantiates Berg's view of the close relationship of *Scoliopus* to the Uvularieae.

It will be of interest to see what is the number of chromosomes found in plants of both species of *Scoliopus* from other localities. The present study suggests that 8 is the normal haploid number for *S. bigelovii* and 7 for *S. hallii*.

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NOTES AND NEWS

THE OCCURRENCE OF A NEW ZEALAND PLANT, *GERANIUM MICROPHYLLUM* IN CALIFORNIA.—This small-flowered geranium native to New Zealand was first collected near Olema, Marin Co., in 1898 by Davy (4342, UC). Eastwood (*Erythraea* 6:117. 1898) identified it as *G. sibiricum* L. and indicated that it was "abundant on the Abbott Ranch, at the entrance to Bear Valley." Howell (*Marin Flora*. 1949) annotated it as "perhaps a shade form of *G. pilosum* Forst. f.". A more recent collection was made in this same area (*McHoul*, May 3, 1965, UC) and has been identified as *G. microphyllum* Hook. f. Plants in this population numbered in the hundreds. *Geranium microphyllum* differs from *G. pilosum* and *G. retrorsum* L'Her. in having 1-flowered pedicels, white flowers with edges faintly tinged with pink, short, thickened roots, not tap roots, almost tuberous in character, and the caudex not branched. Two kinds of pubescence are present, long, white, slightly flattened, trichomes to 1 mm long and shorter hairs. The long trichomes are present on the edges and nerves of the subulate-tipped sepals and the shorter hairs are between the nerves. The upper sides of the leaves are dark green, sparsely covered with short trichomes. The under sides of the leaves are sparsely long and short pubescent and are grayish in color from a thick covering of minutely mealy granules—granulose rather than glandular. The pedicels below the flowers, the stems at nodes, and the petioles are thickly covered with long trichomes. A specimen was sent to Dr. G. Brownlie, University of Canterbury, New Zealand, who confirmed the identification. He indicated that although our specimens are larger in general than New Zealand plants, some in shady sites in scrub do approach the Olema specimens in size.—MARGARET S. BERGSENG, University of California Herbarium, Berkeley.